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PART 1 - GENERAL

- 1.1 Description
- .1 This section specifies the requirements for the earthwork to create disposal sites for material dredged from the Miminegash Harbour. Dredged materials to be placed at the following area:
    - .1 Dredged materials from "Area A" and Area "B" which are suitable for dune nourishment to be placed south of the harbour, on the dune and used reconstruct the dune.
    - .2 Should other materials be discovered in the harbour that are deemed not suitable for dune nourishment, those materials will be designated and subsequently placed on land.
    - .3 all accesses and disposal areas will be completely restored upon completion of the dredging.
- 1.2 Related Sectios
- .1 Section 32 31 27 Sand Fences
  - .2 Section 35 20 23 Dredging
- 1.3 Access Roads
- .1 It is important that persons intending to bid on this work visit the site and ascertain what preparatory work will be required for the following:
    - .1 Access to site via public roads;
    - .2 Access to site via wharf approach road and parking areas;
    - .3 Overhead clearances from power lines;
    - .4 Access to the beach and dune.
  - .2 The contractor will be solely responsible for construction and maintenance of their access haul roads, which will be
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incidental to the work.

- .3 The contractor will be responsible to remove any access roads upon completion and make good any damage to public or private roads and structures.
- .4 Permission to access private property with heavy equipment and pipelines has been obtained.

1.4 Measurement  
Procedures

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- .1 **Earthwork**: Measurement for payment for earthwork to construct and restore on-site disposal cells, salvage shore protection rubble, construct trenches, reconstruct the dune, and restore beach and rubble protection is paid by lump sum.
- .2 **Debris Disposal**: measurement for payment for the collection, stockpiling and disposal of debris collected from the beach area and from harbour dredged materials is by tonne, to be disposed of at appropriate Island Waste Corporation site, and supported by land fill weigh slips.
- .3 Temporary silt fence and other erosion control structures are incidental to the work.
- .4 Mobilization/demobilization of land based construction equipment to be included in the above pay item.
- .5 Salvage of beach protection riprap (pieces of concrete, rubble) from along shoreline, and reinstallation upon completion at the base of dune, is included in Earthwork.
- .6 Haulage/transfer of dredged materials to

the disposal site is part dredging and is paid under Section 35 20 33- Dredging.

- .7 Construction and maintenance of haul roads and access roads will not be measured for payment.
- .8 Any imported fill for construction or restoration is incidental to Earthwork.

## PART 2 PRODUCTS

### 2.1 Materials

- .1 Beach materials: existing sand from the beach and dune.
  - .2 Beach and Dune sands are characterized by the predominance of medium to very coarse sand (86%) with smaller quantities of fine sand to clay (8%) and gravel (6%). Mean particle diameters (D50) range from 0.20 mm (lower foreshore) to 0.47 mm (upper foreshore) with an average D50 of 0.31 mm (Appendix A). Beach sediments are very well sorted with a sorting coefficient<sup>3</sup> of 1.6.
- .2 Existing Rubble Shore Protection: mostly broken concrete slab or curb pieces (size ranging is approximate to rock size R50-R250).
- .3 Dredged materials: Material currently underwater in the harbour.
  - .1 Sediment samples collected on December 10, 2015, from Miminegash Harbour by GHD Limited (GHD, 2016) are characterized by the predominance of medium to very coarse sand (77%) with a smaller fraction of fine sand to clay (23%) and traces of gravel (1%). Mean particle diameters range from 0.12 mm to 0.22 mm with an

average D50 of 0.20 mm. Harbour sediments are poorly sorted with a sorting coefficient of 2.5.

- .2 Dredge material disposal has been designed based on the samples collected from the harbour. There exists a possibility that sediment characteristics may differ from what is described in report.
- .3 Expect debris in Harbour dredged materials.
- .4 Sediment Fence: Type 1 Silt fence as per PEI Transport and Infrastructure Renewal Environmental Protection Plan Section 7.1.3 and Section 806 of General Provisions and Contract Specifications for Highway Construction, Department of Transportation Infrastructure and Energy.
- .5 Sandstone Fill: if required, use clean, durable broken sandstone free from mud, dirt, organic and other deleterious materials. The sandstone will be well graded and have a maximum size of 300 mm. Percent by mass passing No. 12.5 mm sieve not to exceed 40%. Percent by mass passing No. 0.075 mm sieve not to exceed 10%.

### PART 3 - EXECUTION

#### 3.1 Preparation

- .1 Install temporary erosion and sedimentation control measures between the construction site and wetland.
- .1 Install Type 1 Silt fence as per PEI Transport and Infrastructure Renewal Environmental Protection Plan, Section 7.1.3, and General Provisions and Contract Specifications for Highway Construction, Department of Transportation Infrastructure and

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Energy, Section 806.

- .2 The fence is to be opened at 50m intervals immediately after construction to allow access between the beach dune and wetland.
  - .3 Maintain fences throughout the construction, especially after any rain events that may damage the fences.
  - .4 Remove fences after soils have stabilized, and risk of erosion is removed.
  - .2 Make appropriate access to the disposal site based on Contractor's equipment and method of transferring sediment. The temporary access route to the construction site shall be planned and constructed to minimise unnecessary trampling of vegetation, damage to the dunes and to limit the formation of future blowouts.
  - .3 Prepare the portions of dune and beach being used as disposal site as per the Plan and Sections. Inform departmental Representative of any adjustments necessary to the cross section due to existing conditions.
  - .4 Salvage rubble beach protection (R50 to R250) concrete pieces) from the toe of the dune and from the beach, using a rock rake or equivalent equipment. Retrieve any other obvious pieces of rubble from the beach. Salvaged rubble is to be stored for reinstallation into the new work, and can be used during the construction to protect exposed temporary berms.
  - .5 Old lobster traps, fabrics, and other wood and debris shall be collected from the work site, and sent to land fill.
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3.2 Containment Bunds .1  
(Trenches)

Containment Bunds (trenches) are required to contain fluid dredged sediment arriving from the harbour. Layout containment bunds (trenches) along the beach between the toe of the dune the low water mark, in a manner to remain stable during the loading.

- .2 Do not proceed with construction until Departmental Representative has inspected and approved of construction technique and alignment.
  - .3 Exposed embankments can be protected temporarily with salvaged rubble and or fabrics. Install in such a manner that retrieval is guaranteed.
  - .4 Shape containment bunds (trenches) within the construction limits, understanding that the cell are temporary, and could be subjected to washouts or breaches from waves. The Contractor is responsible for the temporary berms, and is to build them to the size required for dredge materials, and schedule their construction according to dredging schedule and weather events.
  - .5 Slope failure with sandy materials is possible. Setup equipment in a manner to avoid hazards associated with steep and unstable dune faces. Inspect, repair, and maintain erosion and sedimentation control measures daily during construction, and remove immediately when soils are stabilized.
  - .6 Dredged materials from harbour to be transferred to disposal area and allowed to decant.
    - .1 If hydraulic dredging, the Contractor is to contain dredged materials, and ensure the trench is sufficient size
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to accommodate the dredged material and water, and may have to limit dredging to allow sediment to decant, or have alternative trenches to infill.

- .2 If a mechanical dredge is used, and materials are transferred to trucks at the wharf and transported to the dune, particular attention shall be given to minimize the destruction of existing vegetation on the Dunes by truck traffic. Also, the amount of water in dredged materials may be significantly reduced from pumped materials, as will be any containment efforts. Departmental Representative or the site inspector will assess if direct placement on the dune can be accomplished without dewatering in a trench.

### 3.3 On-site Containment Cell

- .1 A new containment cell is to be constructed, if required, to accommodate a portion of the harbour dredged materials that are not suitable for dune reconstruction.
- .2 Excavated materials from the containment cell that consist of coarse sand and fill, to be used to build up sides. Any materials excavated from within and suitable for dune reconstruction to be transferred to the sections of dune being reconstructed. Suitability will be determined by Departmental Representative.
- .3 Excavated materials from the containment cell that is not suitable for dune reconstruction will be stockpiled locally and used for backfill and cover of dredged material.
- .4 If necessary to control water, construct an outlet (weir) to control water

reentering the harbour.

.5 Filling the cell with dredged material is covered under the Section - Dredging.

.4 Once the dredged materials have dewatered sufficiently, backfill the cell with salvaged fill and barricade access.

### 3.4 Dune and Beach Restoration

.1 Only after the water has decanted from sediments, and the material can be worked, can the materials be used to reconstruct the dune. The reconstructed beach and dune is accomplished with concepts from Englobe Beach and Dune Reconstruction study, presented in the cross sections. Material loss due to storms and erosion is expected over a long term, but while on site, the contractor is to take steps to reduce risk of damage, and make good repairs to damage if occurs.

.2 Shape and grade reconstructed dunes with dredged materials. Avoid damage to dunes, especially vegetated areas, that are already at the shape represented in the cross section.

.3 Retrieve any debris from dredged materials and beach, and send to appropriate landfill.

.4 The new dune is not intended to be a consistent width or height over the length of the project. The crest width and back slopes will be adjusted to protect intrusion into the wetland while at the same time maximizing the placement of dredged materials on the dune.

.5 Build up the dune with layers of dredged materials no thicker than 400 mm and



compact with tracked equipment or other means to obtain same compaction.

- .6 Dredged materials from Area B, which is silty, to be encapsulated in the dune and not left exposed.
- .7 The beach is to be restored with the original beach materials excavated from the beach. As much as possible, sequence infilling so original beach materials to be on top of any dredged materials.
- .8 Avoid travel across the new shaped and graded dune with motorized vehicles.
- .9 Departmental Representative to inspect and accept grading before installation of sand fences and shore protection.
- .10 Reinstall rubble protection as shown on cross sections.

### 3.5 Protection of Work

- .1 Take into account anticipated weather conditions and degree of exposure of site and tidal conditions in setting requirements for protection.
- .2 Schedule and carry out construction so that each phase of work is not left near water longer than necessary.
- .3 Replacement of rubble protection R50-R100) lost due to storm or tidal erosion will be the responsibility of the Contractors.

-----END OF SECTION-----

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PART 1 - GENERAL

1.1 Description

- .1 This section specifies requirements for excavating Class "B" underwater materials to lines and grades indicated, transporting and placing the material at the approved disposal sites.

1.2 Reference

- .1 01 35 44 Environmental Protection Procedures for Marine Work
- .2 35 00 10 Earthwork

1.3 Definitions

- .1 Class "A" material: solid rock requiring drilling and blasting to loosen, and boulders or rock fragments of individual volumes 1.5m<sup>3</sup> or more.
  - .2 Class "B" material: loose or shale rock, silt, sand, quick sand, mud, shingle, gravel, clay, sand, gumbo, boulders, hardpan and debris of individual volumes less than 1.5m<sup>3</sup>.
  - .3 CMPM: cubic meters place measurement.
  - .4 SQM: area in square metres projected horizontal.
  - .5 Dredging: excavating, transporting and disposing of underwater materials.
  - .6 Debris: pieces of wood, wire rope, scrap steel, pieces of concrete and other waste materials typical of a harbour operation. Debris includes broken HP sections on harbour bottom.
  - .7 Grade: plane above which material is to be dredged.
  - .8 Estimated quantity: volume of material calculated to be above sub-grade and within specified side slopes unless otherwise
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specified.

- .9 Side slope: inclined surface or plane from grade at side limit of dredging area to intersect original ground line outside of side limit and to be expressed as ratio of horizontal to vertical.
  - .10 Chart Datum: by international agreement, a plane which the tide will seldom fall. The Canadian Hydrographic Services has adopted the plane of the Lowest Normal Tide (LNT) as Chart Datum. As the rise, fall and ranges of tides varies daily, The Canadian Hydrographic Services should be consulted for tidal prediction and other tidal information relating to the work.
  - .11 U.T.M. Coordinates: Universal Transverse Mercator grid system (NAD83) to be used for all horizontal control of dredging operation as indicated on Plan.
  - .12 Minimum Mode: mode of operation of hydrographic survey equipment where minimum sounding over length of travel between position updates will be retained in memory. Soundings taken in this mode may be shallower than actual bottom elevations due to variations in water depths due to wave action.
  - .13 Matrix Block: each dredge area is presented as a number of 1.2 x 3.0m long blocks. Dependent on position of sounding, block may have 0 to 4 soundings contained within it.
  - .14 Least of Minimum Plan: hydrographic survey plan in which least sounding in grouping of matrix blocks is plotted.
  - .15 Instantaneous Mode: mode of operation of hydrographic survey equipment where only sounding observed at predetermined distance interval is retained in memory.
  - .16 Average of Instantaneous Plan: hydrographic
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survey plan in which average sounding in an appropriate grouping of matrix blocks is plotted.

- .17 Low Normal Tide (L.N.T.): plane so low that the tide will seldom fall below it. Also referenced the Chart Datum definition above.
- .18 Cleared Sector: A sector of channel in which all dredging areas contained within are acceptably dredged as per the plans and specifications.
- .19 Dredging Area: A rectangle or a polygon defined by coordinates in which dredging is to take place.

#### 1.4 Dredging Area

- .1 The work consist of dredging the areas indicated on the drawing and as specified herein.
  - .1 Dredge Area A - materials suitable for beach and dune reconstruction.
  - .2 Dredge Area B - materials suitable for beach and dune reconstruction, but are silty, and not to be place on the beach, but rather placed inside dune.
- .2 All property outside of the work areas shown on plan are to be considered out of bounds.

#### 1.5 Dredge Grade

- .1 Dredge Area A: -1.5 m below Chart Datum(Elevation 0.00)
- .2 Dredge Area B : -1.5 m below Chart Datum (Elevation 0.00)

#### 1.6 Disposal Sites

- .1 Disposal areas for dredged materials:
  - .1 Dredged Materials from Area A - South of harbour as dune nourishment.
  - .2 Dredged Materials from Area B - South of harbour as dune reconstruction

material, but encapsulated in dune, not on dune face.

.3 Debris - Regional landfill.

.4 Dredged materials not suitable for dune nourishment, if encountered, to be buried in Containment Area.

1.7 Requirements of  
Regulatory Agencies

.1 Perform work, in accordance with National Regulatory Agencies Building Code of Canada (NBC) and any other municipal, provincial and/or national codes relating to project including the provisions of the Environmental Protection Act Permit issued for this project. In any case of conflict or discrepancy, the more stringent requirements will apply.

.2 Meet or exceed requirements of specified standards, codes and reference documents.

.3 Mark floating equipment with lights in accordance with regulations for the Prevention of Collisions.

1.8 Interface to  
Fisheries Operations  
and Damage  
Fishing Gear

.1 Become familiar with fishery activities. Clearly mark dredging area, disposal areas and to routes to and from dredging and disposal areas during periods when fishing gear is set in areas adjacent to dredging operations, with "Cautionary Buoys" in accordance with Coast Guard Standard TP968-1984. All buoys must be colored cautionary yellow - CGSB #505-108.

.2 Execute the work to ensure damage does not occur to fishing gear and interference to fishing operations is minimized by conducting operations within the areas so marked.

.3 Be responsible for damage to fishing gear outside marked areas and, if damage occurs, assume responsibility for replacement or repair costs and cost of lost fishing

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opportunity.

1.9 Site  
Information

- .1 Results of most recent soundings are included with drawings. This data is made available for tendering purposes only. It should be noted that this information may differ from present site condition and the Contractor should take this into consideration when submitting his tender.
- .2 The harbour was last dredged in 2008. During dredging, debris (wire, ropes, tires, microwaves, wood sheathing, metals etc.) was encountered and removed. DFO-SCH has no reference for the quantity of debris that will be encountered in this dredging, but cautions the Contractor to prepare for debris that is typical in quantity and type of an active marine facility.

1.10 Site  
Conditions

- .1 The Contractor shall take the necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.

1.11 Survey  
Requirements

- .1 The Contractor shall provide, at his expense, a survey vessel, equipment and crew to set up and maintain control for location of dredge limits and to sound areas immediately after dredging to verify that grade depth has been attained. Areas are to be sounded to provide a sounding printout display of at least a 3 meter by 3 meter UTM grid to the approval of the Departmental representative.
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1.12  
Measurement  
for Payment

- .1 **Mobilization and Demobilization:**  
Mobilization and demobilization of the dredge(s), barges, support vessels and pipelines, to be paid as a fixed lump sum payment covering all items of work. Half of the sum allocated for mobilization and demobilization, shall be payable upon commencement of dredging and the remainder shall be payable after project completion.
- .2 Moving off the channel to accommodate fishing vessels is incidental to the work, and will not be measured under this item.
- .3 Any remediation to prevent the possible transport of alien species from port to port will be included in this item. See Environmental Protection Section 01 35 44.
- .4 **Dredging (CMPM):** will be measured in cubic metres, in-place measurement (CMPM), determined from soundings taken before and after dredging. For purpose of quantity computation, existing seabed elevation will be represented by "Average of Instantaneous" sounding for each matrix block of survey by Departmental representative as soon as practical after Contract award. Post dredging elevation for quantity computations will be shallowest of grade, bedrock or "Average of Instantaneous" sounding for each matrix block.
- .5 The cost of accessing the dredge site will be included in the price for dredging.
- .6 All operations in connection with the field positioning of dredging equipment will be considered incidental to the work and will not be measured separately for payment.
- .7 No payment will be made for the Contractor's survey vessel, equipment and crew.
- .8 There will not be any additional payment for

the construction and removal of any temporary roads or causeways to access the site. Include the cost of doing this work in the above items for payment. Material used for roads is to be taken off site at contractor's expense.

- .9 There will be no additional payment for delays caused by weather conditions or down time.
- .10 There will be no additional payment for weight restrictions.
- .11 There will be no additional payment for delays encountered to removal debris from that harbour, provided it is of a typical quantity and type to a Marine facility.
- .12 All operations in connection with the field positioning of dredging equipment will be considered incidental to the work and will not be measured separately for payment.
- .13 There will be no additional payment for down time.
- .14 Excavation of beach trench for disposal, and reconstruction of the dune Section 35 00 10.

1.13 Sequence of  
Acceptance of Work

- .1 No area will be dredged prior to Departmental Representative and Contractor's mutual acceptance of the pre-dredge survey for that area.
- .2 Inform Departmental Representative in advance of completion of dredging to schedule hydrographic surveys.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 Layout

- .1 Lay out work from bench marks and base lines



provided by Departmental Representative. Be responsible for accuracy of work relative to established bench marks. Provide and maintain electronic position fixing and distance measuring equipment, laser transits and such other equipment as normally required for accurate dredging control.

- .2 Establish and maintain water level gauges tide boards in order that proper depth of dredging can be determined. Locate gauges tide boards so as to be clearly visible.
- .3 Establish and maintain on-land targets for location and definition of designated dredge area limits. Targets to be suitable for control of dredging operations and locating soundings. Remove targets on completion of work.
- .4 It will be the Contractor's responsibility to gain access to the dredge area. Any derricks, power lines, etc., which will require removal will be done so at the Contractor's expense and will be replaced to the satisfaction of the Departmental Representative.

### 3.2 General

- .1 Mark floating equipment with lights in accordance with International Rules of Road and maintain radio watch on board.
- .2 Place and maintain buoys, pins, ranges, markers and lights required to define work and disposal areas.
- .3 Lay out Work from bench marks ranges and base lines established by Departmental Representative. Be responsible for accuracy of Work relative to establish bench marks ranges and baseline. Provide and maintain positioning and such other equipment as normally required for accurate dredging control.
- .4 Establish and maintain tide boards in order that proper depth of dredging can be

determined. Locate tide boards so as to be clearly visible.

- .5 Remove materials above specified grade depths, within limits indicated. Material removed from below subgrade depth or outside specified area or side slope is not part of Work.
- .6 Remove shoaling which occurs as result of Work at no expense to Departmental Representative.
- .7 Remove infilling in dredge areas which occurs prior to acceptance by Departmental Representative.
- .8 Immediately notify Departmental Representative upon encountering object which might be classified as obstruction, or materials not suitable for dune reconstruction. By-pass object/area after clearly marking its location and continue Work.

### 3.3 Disposal of Dredged Material

- .1 Disposal of dredged material to the disposal site in manner approved by Departmental Representative.
- .2 Disposal of dredged material will be carried out in accordance with the terms and conditions set down in permits issued by Province of Prince Edward Island.

### 3.4 Dredging in Vicinity of Structures

- .1 Do not dredge material from areas lying within 1.0 m of existing structures.
- .2 If tracked land based equipment is used, the contractor is responsible to protect / concrete and asphalt surfaces. Used conveyer belt or timbers would be considered acceptable. Confirm with Departmental Representative which method of protection is to be used.
- .3 Keep all dredging equipment a minimum of

300mm away from wheelguards. Any damages occurred during the dredging operations will be paid for by the contractor.

3.5 Final Dredge Grade .1

The contractor is to verify the final grade in the dredge area by an acceptable method.

- .2 If, as result of incomplete work, additional verification of depths by sounding or sweeping becomes necessary, additional costs involved shall be paid by Contractor.

3.6 Re-dredging

- .1 Re-dredge unsatisfactory Work and verify depths with additional sounding to approval of Departmental Representative.

-----END OF SECTION-----